

Mutagenic Evaluation of Compound FDA 73-82 (Sodium Ferric Pyrophosphate)
6/15/75

N25

LBI PROJECT #2468

MUTAGENIC EVALUATION OF
COMPOUND FDA 73-82

010045871

SODIUM FERRIC PYROPHOSPHATE

SUBMITTED TO

FOOD & DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

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JUNE 15, 1975



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EVALUATION SUMMARY

Compound FDA 73-82, Sodium Ferric Pyrophosphate, did not exhibit genetic activity in any of the in vitro microbial assays employed in this evaluation.



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DATE: June 15, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound 010045871, Sodium Ferric Pyrophosphate
FDA 73-82

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974
2. Description: Fine grey powder

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

<u>Component</u>	<u>Final Concentration/ml</u>
1. TPN (sodium salt)	6 μM
2. Isocitric acid	49 μM
3. Tris buffer, pH 7.4	28 μM
4. MgCl_2	1.7 μM
5. Tissue homogenate fraction	72 mg



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D. Tissue Homogenates and Supernatants

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1.

POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

<u>Assay</u>	<u>Chemical^a</u>	<u>Solvent</u>	<u>Probable Mutagenic Specificity</u>
Nonactivation	Ethyl methanesulfonate	Water or saline	BPS ^b
	2-Nitrofluorene	Dimethylsulfoxide ^c	FS ^b
	Quinacrine mustard	Water or saline	FS
Activation	Dimethylnitrosamine	Water or saline	BPS ^b
	2-Acetylaminofluorene	Dimethylsulfoxide ^c	FS ^b

^a Concentrations given in the Results Section

^b BPS = base-pair substitution; FS = frameshift

^c Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.



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B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (Test, Positive Control and Solvent Control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Nonactivation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the nonactivation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for nonactivation tests.



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D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities of tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. The data were then processed and printed from a computer program.



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IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound:
010045871 Sodium Ferric Pyrophosphate
2. Test solvent: Saline
3. Solubility of the test compound under treatment conditions:
Soluble under treatment conditions
4. Additional comments: Fine grey powder

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: March 25, 1975
2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

10.0
1.0
0.1
0.01
0.001

3. Concentrations of the test compound used in the mutagenicity tests:

Dose	<u>Percent Concentration</u>	
	Bacteria	Yeast
1/4 50% Survival	0.625	2.5
1/2 50% Survival	1.250	5.0
50% Survival	2.500	10.0
Plate Tests	1.250	--



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V. SUMMARY OF TEST RESULTS

Plate Tests

A. Name or code designation of the test compound: 010045871

B. Test date: April 23, 1975

C. Concentration of the test compound: 1.25%

<u>Test</u>	<u>Species</u>	<u>Tissue</u>	<u>Revertants/Plate</u>					
			TA-1535		TA-1537		TA-1538	
1	2	1	2	1	2	1	2	
1. Nonactivation								
Solvent Control	---	---	138	146	25	22	26	35
Positive Control ^a	---	---	>10 ⁴	>10 ⁴	193	176	158	219
Test Compound	---	---	142	156	31	24	43	39
2. Activation								
Negative Control	---	---	16	15	27	23	11	14
Solvent Control	---	---	12	9	36	43	17	18
Reaction Mixture Control	---	---	10	18	36	39	9	17
Positive Control ^b	Mouse	Liver	>10 ³	>10 ³	146	183	239	225
Positive Control		Lung	9	8	33	33	14	11
Positive Control		Testes	11	7	37	32	15	15
Positive Control	Rat	Liver	>10 ³	>10 ³	84	80	329	313
Positive Control		Lung	10	8	32	35	16	12
Positive Control		Testes	11	6	24	43	16	16
Positive Control	Monkey	Liver	>10 ³	>10 ³	47	43	122	129
Positive Control		Lung	7	9	32	38	15	10
Positive Control		Testes	9	5	28	33	15	15
Test Compound	Mouse	Liver	6	15	13	23	22	20
Test Compound		Lung	11	10	23	15	20	10
Test Compound		Testes	14	7	24	22	14	16
Test Compound	Rat	Liver	7	14	16	22	20	19
Test Compound		Lung	13	9	23	16	22	9
Test Compound		Testes	11	6	19	23	18	19
Test Compound	Monkey	Liver	6	14	15	18	22	22
Test Compound		Lung	11	9	21	12	20	12
Test Compound		Testes	13	7	14	20	9	17

a TA-1535 EMS 10 µl/plate
 TA-1537 QM 20 µg/plate
 TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µM/plate
 TA-1537 AAF 100 µg/plate
 TA-1538 AAF 100 µg/plate



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DATA TABLE TERMS AND ABBREVIATIONS

<u>ABBREVIATION OR TERM</u>	<u>DEFINITION OR EXPLANATION</u>																												
COMPOUND	Client designated compound number appears in this column.																												
TEST CODES	<table> <tr> <td>NAN</td><td>= Nonactivation: Solvent Control</td></tr> <tr> <td>NAP</td><td>= Nonactivation: Positive Control</td></tr> <tr> <td>NA1</td><td>= Nonactivation: Test Compound Dose 1</td></tr> <tr> <td>NA2, etc.</td><td>= Reflects the other dose level(s)</td></tr> <tr> <td>A+C</td><td>= Negative Chemical Control</td></tr> <tr> <td>A-C</td><td>= Activation: Solvent Control</td></tr> <tr> <td>ACP</td><td>= Activation: Positive Control</td></tr> <tr> <td>ACT</td><td>= Activation: Test Compound</td></tr> <tr> <td>A+T</td><td>= Activation: Tissue Control</td></tr> <tr> <td>LI</td><td>= Liver Tissue Activation Fraction</td></tr> <tr> <td>LU</td><td>= Lung Tissue Activation Fraction</td></tr> <tr> <td>KI</td><td>= Kidney Tissue Activation Fraction</td></tr> <tr> <td>TE</td><td>= Testes Tissue Activation Fraction</td></tr> <tr> <td>1,2, etc.</td><td>= Dose Levels</td></tr> </table>	NAN	= Nonactivation: Solvent Control	NAP	= Nonactivation: Positive Control	NA1	= Nonactivation: Test Compound Dose 1	NA2, etc.	= Reflects the other dose level(s)	A+C	= Negative Chemical Control	A-C	= Activation: Solvent Control	ACP	= Activation: Positive Control	ACT	= Activation: Test Compound	A+T	= Activation: Tissue Control	LI	= Liver Tissue Activation Fraction	LU	= Lung Tissue Activation Fraction	KI	= Kidney Tissue Activation Fraction	TE	= Testes Tissue Activation Fraction	1,2, etc.	= Dose Levels
NAN	= Nonactivation: Solvent Control																												
NAP	= Nonactivation: Positive Control																												
NA1	= Nonactivation: Test Compound Dose 1																												
NA2, etc.	= Reflects the other dose level(s)																												
A+C	= Negative Chemical Control																												
A-C	= Activation: Solvent Control																												
ACP	= Activation: Positive Control																												
ACT	= Activation: Test Compound																												
A+T	= Activation: Tissue Control																												
LI	= Liver Tissue Activation Fraction																												
LU	= Lung Tissue Activation Fraction																												
KI	= Kidney Tissue Activation Fraction																												
TE	= Testes Tissue Activation Fraction																												
1,2, etc.	= Dose Levels																												
CONCENTRATION	All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units. Example: 0025-2PCT = 0.25 percent concentration																												
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., EP + 6 = $\times 10^6$).																												
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., EP + 0 = 10^0). For strain D4, MUT 1 represents the number of ADE+ convertants.																												
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.																												
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.																												
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.																												
CONTAM	Presence of contamination on any plates.																												



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DATA TABLE TERMS AND ABBREVIATIONS (continued)

<u>ABBREVIATION OR TERM</u>	<u>DEFINITION OR EXPLANATION</u>
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (<u>Macaca mulatta</u>)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES / COMPOUND 010045871

TEST	ORG	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1535 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
------	-----	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

NAN		5.32	1.24	12.94	1.89	1.48
NAP		1764.20	922.93	771.32	129.05	155.87
NA1		5.22	2.12	4.18	0.83	1.66
NA2		7.14	2.40	2.88	2.11	2.29



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES ICREFLO/MOUSE

COMPOUND 010045871

TEST	ORG	TA1537 HIS EX-8	TA1535 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	20.45	3.23	6.88	2.25	1.59
ACT	A+T	35.90	7.69	6.31	3.25	1.59
ACT	A-C	12.22	7.45	2.93	0.96	0.17
ACT	PLI	45.07	5496.88	15.26	7.59	6.16
ACT	PLU	20.50	4.79	4.48	2.42	2.60
ACT	PTE	28.79	9.15	2.33	3.81	2.06
ACT	LI1	8.23	8.64	1.89	2.04	1.97
ACT	LI2	6.05	5.25	3.32	2.55	1.57
ACT	LU1	14.95	7.20	2.09	1.74	1.38
ACT	LU2	14.71	6.98	2.06	3.97	1.84
ACT	TE1	4.41	13.64	1.16	2.70	2.10
ACT	TE2	3.70	11.36	2.31	3.07	1.36



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES SPRDAM/RAT

COMPOUND 010045871

TEST	ORG	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	4.48	4.75	10.86	2.85	1.11
ACT	A+T	2.48	6.57	10.31	2.43	1.66
ACT	A-C	5.52	9.05	8.87	2.68	1.44
ACT	PLI	333.15	20.33	17.19	4.50	4.42
ACT	PLU	6.11	8.76	14.09	2.49	1.03
ACT	PTE	8.60	6.77	11.40	3.24	1.66
ACT	LI1	4.35	6.81	4.00	1.36	1.45
ACT	LI2	5.25	4.76	5.22	1.34	3.02
ACT	LU1	7.58	3.78	9.09	2.74	0.73
ACT	LU2	6.87	5.10	7.17	3.52	1.92
ACT	TE1	5.91	3.37	2.31	3.97	2.92
ACT	TE2	6.49	6.33	2.85	3.19	0.99



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES RHESUS/MONKEY COMPOUND 010045871

TEST	DRG	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1535 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	6.36	10.43	4.50	1.82	1.82
ACT	A+T	3.92	5.80	5.62	2.59	2.73
ACT	A-C	5.63	2.70	7.72	2.16	1.80
ACT	PLI	10.56	54.55	1194.98	6.38	3.75
ACT	PLU	5.60	5.22	5.81	2.40	2.64
ACT	PTE	8.26	6.61	3.99	5.41	2.30
ACT	LI1	5.72	4.55	5.74	3.49	3.49
ACT	LI2	5.90	2.45	3.69	2.90	1.38
ACT	LU1	4.73	1.37	7.68	2.27	1.82
ACT	LU2	2.93	1.22	3.85	3.44	1.96
ACT	TE1	3.40	2.81	5.05	2.85	1.59
ACT	TE2	7.88	2.30	3.61	3.44	2.25



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VI. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound 010045871, Sodium Ferric Pyrophosphate, was tested for genetic activity in a series of in vitro microbial assays with and without metabolic activation. The following results were obtained:

A. Salmonella typhimurium

1. Plate tests

At a concentration of 1.25%, this compound was not mutagenic in the bacterial plate tests with or without activation.

2. Nonactivation suspension tests

The results of these tests were negative.

3. Activation suspension tests

The results of these tests were negative.

B. Saccharomyces cerevisiae

1. Nonactivation suspension tests

The results of these tests were negative.

2. Activation suspension tests

The results of these tests were negative.

C. Conclusions

The test compound, Sodium Ferric Pyrophosphate, did not exhibit genetic activity in the in vitro assays employed in this evaluation.

Submitted by:



David Brusick, Ph.D.
Director of Genetics



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APPENDIX

Tabulation of Data



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104				PROJECT 02468		DATE - 07/08/75	
EXPERIMENT	509802	DETECTOR	TA1535	SPECIES	/		
COMPOUND	TEST	ORG ID	CONCENTRATION	POP11 EP+6	MUT1 EP+0	FRF01 EP-8	CONTAM
	NAN		SALINE	0487	0063	12.94	0
	NAP		FMS 0.002 %	0537	4142	771.32	0
010045871	NA1		0125-2 PCT.	0550	0023	4.18	0
010045871	NA2		0625-3 PCT.	0625	0018	2.88	0

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BIONETICSREPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104
EXPERIMENT 511301 DETECTOR TA1537 SPECIES / PROJECT 02468

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUP EP+6	MUT1 EP+0	FREQ1 FP-8	CONTAM
NAN			SALINE	0601	0032	5.32	0
NAP			DM 1.0 UG/ML	0257	4534	1764.20	0
010045871	NA1		0125-2 PCT.	0268	0014	5.22	?
010045871	NA2		0625-3 PCT.	0252	0018	7.14	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 509803 DETECTOR TA1538 SPECIES /
PROJECT 02468
DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP11 EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	NAN		DMSO	0563	0007	1.24	0
	NAP		NF 125 UG-ML	0567	5233	922.93	0
010045871	NA1		0125-2 PCT.	0756	0016	2.12	0
010045871	NA2		0625-3 PCT.	0583	0014	2.40	0



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REPORT FXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 514705 DETECTOR 0000D4 SPECIES / PROJECT 02468
DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FRF01 FP-5	FRF02 FP-5	CONTAM
	NAN		SALTINE	0741	0014	0011	1.89	1.48	0
	NAP		FMS 1.0 %	0179	0231	0279	129.05	155.87	0
010045871	NA1		0005-0 PCT.	0722	0006	0012	0.83	1.66	6
010045871	NA2		0025-1 PCT.	0568	0012	0013	2.11	2.29	7



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104			PROJECT 02468			DATE - 07/08/75	
EXPERIMENT 517803	DETECTOR TA1535	SPECIES ICRFLD/MOUSE					
COMPOUND	TEST ID	ORG	CONCENTRATION	POPUP EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	A-C		SALINE	0738	0055	7.45	0
010045871	ACT	LI1	0125-2 PCT.	0324	0028	8.64	0
010045871	ACT	LI2	0625-3 PCT.	0419	0022	5.25	2
010045871	ACT	LU1	0125-2 PCT.	0472	0034	7.20	2
010045871	ACT	LU2	0625-3 PCT.	0573	0040	6.98	0
010045871	ACT	TF1	0125-2 PCT.	0176	0024	13.64	1
010045871	ACT	TF2	0625-3 PCT.	0264	0030	11.36	0
	A+C		DMN 50 UM/ML	0650	0021	3.23	0
	A+T		DMN 50 UM/ML	0156	0012	7.69	0
	ACP	LI	DMN 50 UM/ML	0096	5277	5496.88	0
	ACP	LU	DMN 50 UM/ML	0313	0015	4.79	0
	ACP	TE	DMN 40 UM/ML	0153	0014	9.15	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104
EXPERIMENT 517602 PROJECT 02468
DETECTOR TA1537 SPECIES ICREFLO/MOUSE
DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP1 EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0308	0063	20.45	0
	A+T		***NO MATCH***	0078	0028	35.90	1
	A-C		DMSO	0483	0059	12.22	0
	ACP	LI	AAF 800 UG/ML	0071	0032	45.07	1
	ACP	LU	AAF 800 UG/ML	0161	0033	20.50	0
	ACP	TE	AAF 800 UG/ML	0198	0057	28.79	0
010045871	ACT	L11	0125-2 PCT.	0231	0019	8.23	0
010045871	ACT	L12	0625-3 PCT.	0281	0017	6.05	0
010045871	ACT	LU1	0125-2 PCT.	0194	0029	14.95	2
010045871	ACT	LU2	0625-3 PCT.	0204	0030	14.71	2
010045871	ACT	TE1	0125-2 PCT.	0204	0009	4.41	2
010045871	ACT	TE2	0625-3 PCT.	0162	0006	3.70	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 EXPERIMENT 509701 DETECTOR TA1538				PROJECT 02468 SPECIES ICRFLU/MOUSE			DATE - 07/08/75
COMPOUND	TEST	ORG ID	CONCENTRATION	POPUP EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0858	0059	6.88	0
	A+T		***NO MATCH***	0666	0042	6.31	0
	A-C		DMSO	0819	0024	2.93	0
	ACP	LI	AAF 800 UG/ML	0675	0103	15.26	0
	ACP	LU	AAF 800 UG/ML	1026	0046	4.48	2
	ACP	TE	AAF 800 UG/ML	0945	0022	2.33	0
010045871	ACT	L11	0125-2 PCT.	0423	0008	1.89	0
010045871	ACT	L12	0625-3 PCT.	0422	0014	3.32	2
010045871	ACT	LU1	0125-2 PCT.	0527	0011	2.09	2
010045871	ACT	LU2	0625-3 PCT.	0535	0011	2.06	2
010045871	ACT	TE1	0125-2 PCT.	0859	0010	1.16	2
010045871	ACT	TE2	0625-3 PCT.	0649	0015	2.31	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104
EXPERIMENT 512601 DETECTOR 0000D4 PROJECT 02468
SPECIES ICRFL0/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPNU EP+4	MUT1 EP+1	MUT2 EP+1	FRE01 FP-5	FRE02 FP-5	CONTAM
	A+C		DMN 90 UM/ML	0755	0017	0012	2.25	1.59	0
	A+T		***NO MATCH***	1260	0041	0020	3.25	1.59	6
	A-C		SALINE	1145	0011	0002	0.96	0.17	0
	ACP	LI	DMN 90 UM/ML	0909	0069	0056	7.59	6.16	6
	ACP	LU	DMN 90 UM/ML	1117	0027	0029	2.42	2.60	0
	ACP	TE	DMN 90 UM/ML	0970	0037	0020	3.81	2.06	6
010045871	ACT	LI1	0005-0 PCT.	1419	0029	0028	2.04	1.97	6
010045871	ACT	LI2	0025-1 PCT.	1020	0026	0016	2.55	1.57	6
010045871	ACT	LU1	0005-0 PCT.	1089	0019	0015	1.74	1.38	2
010045871	ACT	LU2	0025-1 PCT.	0705	0028	0013	3.97	1.84	0
010045871	ACT	TE1	0005-0 PCT.	1001	0027	0021	2.70	2.10	6
010045871	ACT	TE2	0025-1 PCT.	1107	0034	0015	3.07	1.36	6



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 510801 DETECTOR TA1535 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ID	ORG	CONCENTRATION	POPU	MUT1	FRF01	CONTAM
					EP+6	EP+0	EP-8	
	A+C			DMN 50 UM/ML	0692	0031	4.48	0
	A+T			***NO MATCH***	0483	0012	2.48	3
	A-C			SALINE	0725	0040	5.52	0
	ACP	LI	DMN 50 UM/ML	0368	1226		333.15	1
	ACP	LU	DMN 50 UM/ML	0311	0019		6.11	0
	ACP	TE	DMN 50 UM/ML	0349	0030		8.60	0
010045871	ACT	LI1	0125-2 PCT.	0299	0013		4.35	2
010045871	ACT	LI2	0625-3 PCT.	0343	0018		5.25	2
010045871	ACT	LU1	0125-2 PCT.	0343	0026		7.58	2
010045871	ACT	LU2	0625-3 PCT.	0451	0031		6.87	2
010045871	ACT	TF1	0125-2 PCT.	0220	0013		5.91	2
010045871	ACT	TF2	0625-3 PCT.	0231	0015		6.49	3

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COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104
EXPERIMENT 511501 PROJECT 02468
DETECTOR TA1537 SPECIES SPRDAW/RAT
DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP11 EP+6	MUT1 EP+0	FRE01 FP-8	CONTAM
	A+C		AAF 800 UG/ML	0663	0072	10.86	0
	A+T		***NO MATCH***	0446	0046	10.31	0
	A-C		DMSO	0688	0061	8.87	0
	ACP	LI	AAF 800 UG/ML	0512	0088	17.19	2
	ACP	LU	AAF 800 UG/ML	0589	0083	14.09	0
	ACP	TE	AAF 800 UG/ML	0544	0062	11.40	0
010045871	ACT	LI1	0125-2 PCT.	0225	0009	4.00	2
010045871	ACT	LI2	0625-3 PCT.	0268	0014	5.22	2
010045871	ACT	LU1	0125-2 PCT.	0275	0025	9.09	2
010045871	ACT	LU2	0625-3 PCT.	0223	0016	7.17	2
010045871	ACT	TF1	0125-2 PCT.	0216	0005	2.31	2
010045871	ACT	TE2	0625-3 PCT.	0246	0007	2.85	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 511801 DETECTOR TA1538 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP1 EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0926	0044	4.75	0
	A+T		***NO MATCH***	0792	0052	6.57	0
	A-C		DMSO	0707	0064	9.05	0
	ACP	LI	AAF 800 UG/ML	0718	0146	20.33	2
	ACP	LU	AAF 800 UG/ML	0833	0073	8.76	0
	ACP	TE	AAF 800 UG/ML	0886	0060	6.77	2
010045871	ACT	LI1	0125-2 PCT.	0367	0025	6.81	0
010045871	ACT	LI2	0625-3 PCT.	0420	0020	4.76	0
010045871	ACT	LU1	0125-2 PCT.	0502	0019	3.78	0
010045871	ACT	LU2	0625-3 PCT.	0471	0024	5.10	0
010045871	ACT	TE1	0125-2 PCT.	0563	0019	3.37	0
010045871	ACT	TF2	0625-3 PCT.	0442	0028	6.33	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 512501 DETECTOR 000004 SPECIES SPRDAM/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	PPNU EP+4	MUT1 FP+1	MUT2 FP+1	FREQ1 FP-5	FREQ2 FP-5	CONTAM
	A+C		DMN 90 UM/ML	1438	0041	0016	2.85	1.11	0
	A+T		***NO MATCH***	0906	0022	0015	2.43	1.66	7
	A-C		SALINF	1044	0028	0015	2.68	1.44	0
	ACP	LI	DMN 90 UM/ML	1177	0053	0052	4.50	4.42	6
	ACP	LU	DMN 90 UM/ML	1167	0029	0012	2.49	1.03	0
	ACP	TE	DMN 90 UM/ML	1203	0039	0020	3.24	1.66	0
010045871	ACT	LI1	0005-0 PCT.	1106	0015	0016	1.36	1.45	7
010045871	ACT	LI2	0025-1 PCT.	0893	0012	0027	1.34	3.02	6
010045871	ACT	LU1	0005-0 PCT.	1096	0030	0008	2.74	0.73	0
010045871	ACT	LU2	0025-1 PCT.	0937	0033	0018	3.52	1.92	0
010045871	ACT	TE1	0005-0 PCT.	0856	0034	0025	3.97	2.92	0
010045871	ACT	TE2	0025-1 PCT.	0908	0029	0009	3.19	0.99	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 509901 DETECTOR TA1535 SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUP EP+6	MUT1 FP+0	FRE01 FP-8	CONTAM
	A+C		DMN 50 UM/ML	0756	0034	4.50	0
	A+T		***NO MATCH***	0534	0030	5.62	0
	A-C		SALINE	0479	0037	7.72	1
	ACP	LI	DMN 50 UM/ML	0458	5473	1194.98	0
	ACP	LU	DMN 50 UM/ML	0551	0032	5.81	0
	ACP	TE	DMN 50 UM/ML	0426	0017	3.99	2
010045871	ACT	LI1	0125-2 PCT.	0331	0019	5.74	2
010045871	ACT	LI2	0625-3 PCT.	0488	0018	3.69	0
010045871	ACT	LU1	0125-2 PCT.	0547	0042	7.68	0
010045871	ACT	LU2	0625-3 PCT.	0650	0025	3.85	3
010045871	ACT	TE1	0125-2 PCT.	0495	0025	5.05	2
010045871	ACT	TE2	0625-3 PCT.	0416	0015	3.61	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 EXPERIMENT 511901 DETECTOR TA1537				PROJECT 02468 SPECIES RHESUS/MONKEY			DATE - 07/08/75
COMPOUND	TEST	ORG ID	CONCENTRATION	POP1 EP+6	MUT1 EP+0	FRF01 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0692	0044	6.36	0
	A+T		***NO MATCH***	0638	0025	3.92	0
	A-C		DMSO	0533	0030	5.63	0
	ACP	LI	AAF 800 UG/ML	0606	0064	10.56	0
	ACP	LU	AAF 800 UG/ML	0643	0036	5.60	0
	ACP	TE	AAF 800 UG/ML	0545	0045	8.26	0
010045871	ACT	LI1	0125-2 PCT.	0472	0027	5.72	0
010045871	ACT	LT2	0625-3 PCT.	0441	0026	5.90	0
010045871	ACT	LU1	0125-2 PCT.	0338	0016	4.73	0
010045871	ACT	*LU2	0625-3 PCT.	0409	0012	2.93	0
010045871	ACT	TF1	0125-2 PCT.	0470	0016	3.40	0
010045871	ACT	TF2	0625-3 PCT.	0292	0023	7.88	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAILCONTRACT 22374-2104
EXPERIMENT 510001 DETECTOR TA1538 PROJECT 02468
SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0748	0078	10.43	0
	A+T		***NO MATCH***	0742	0043	5.80	2
	A-C		DMSO	0742	0020	2.70	2
	ACP	LI	AAF 800 UG/ML	0638	0348	54.55	0
	ACP	LU	AAF 800 UG/ML	0901	0047	5.22	0
	ACP	TE	AAF 800 UG/ML	0681	0045	6.61	0
010045871	ACT	LI1	0125-2 PCT.	0505	0023	4.55	3
010045871	ACT	LI2	0625-3 PCT.	0490	0012	2.45	2
010045871	ACT	LU1	0125-2 PCT.	0583	0008	1.37	2
010045871	ACT	LU2	0625-3 PCT.	0820	0010	1.22	0
010045871	ACT	TF1	0125-2 PCT.	0675	0019	2.81	2
010045871	ACT	TF2	0625-3 PCT.	0565	0013	2.30	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 514202 DETECTOR 000004 PROJECT 02468
SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FRE01 EP-5	FRE02 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0658	0012	0012	1.82	1.82	1
	A+T		***NO MATCH***	0695	0018	0019	2.59	2.73	1
	A-C		SALINE	0555	0012	0010	2.16	1.80	7
	ACP	LI	DMN 90 UM/ML	0799	0051	0030	6.38	3.75	0
	ACP	LU	DMN 90 UM/ML	0832	0020	0022	2.40	2.64	1
	ACP	TE	DMN 90 UM/ML	0739	0040	0017	5.41	2.30	4
010045871	ACT	LI1	0005-0 PCT.	0773	0027	0027	3.49	3.49	0
010045871	ACT	LI2	0025-1 PCT.	0723	0021	0010	2.90	1.38	1
010045871	ACT	LU1	0005-0 PCT.	0881	0020	0016	2.27	1.82	1
010045871	ACT	LU2	0025-1 PCT.	0815	0028	0016	3.44	1.96	5
010045871	ACT	TF1	0005-0 PCT.	0878	0025	0014	2.85	1.59	0
010045871	ACT	TF2	0025-1 PCT.	0756	0026	0017	3.44	2.25	0